

TWO NEW SPECIES OF PYRENULA (LICHENIZED LOCULOASCOMYCETES: PYRENULACEAE) FROM THE WEST INDIES

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Harris, Richard C. (New York Botanical Garden, Bronx, NY 10458, U. S. A.). Two new species of *Pyrenula* (Lichenized Loculoascomycetes: Pyrenulaceae) from the West Indies. *Moscoso* 6: 213-216. 1990. Two species which support a broad definition of the genus *Pyrenula* Ach. are described as new, *P. expectata* R. C. Harris from the Virgin Islands and *P. kermesina* R. C. Harris from the Dominican Republic. Additional new combination are *Pyrenula palmarum* (Krempelh.) R. C. Harris, *P. personata* (Malme) R. C. Harris and *Ciferriolichen majusculus* (Nyl.) R. C. Harris.

The purpose of this paper, in addition to the obvious one of describing two new taxa, is to reinforce a revised concept of *Pyrenula* Ach. introduced in Harris (1989) and to provide a correction and an update. Since that work dealt only with the species of eastern North America, it was inappropriate to treat the two new West Indian species even though they would have strengthened the argument for a broad definition of *Pyrenula*. I reject the concepts that ostiole characters and ascospore septation characters are sufficient to define genera. In fact in my view, genera based on these characters obscure phylogenetic relationships and place very closely related species into different genera. The species described here bear directly on the validity of the use of ostiole characters used by Mueller to define genera and by Zahlbruckner even to define families (see Harris, 1989 for references). There are three common ostiole types in the Pyrenulaceae, apical (pyrenuloid), eccentric to lateral (parathelioid) and lateral fused or emerging in a common gelatinized plug (pyrenastroid). Zahlbruckner placed these types in separate genera and families, i. e., *Pyrenula* Ach. in the Pyrenulaceae, *Parathelium* Nyl. in the Paratheliaceae and *Pyrenastrum* Eschw. in the Astrotheliaceae. I recognize only a single genus, *Pyrenula*. The two species described below provide additional examples of groups of closely related species which transgress the artificial limits of Zahlbruckner's system. I expect that *Pyrenula* s. lat. eventually may be broken into smaller genera but not by such artificial characters as in the past.

Pyrenula spectata R. C. Harris, sp. nov.

Similis *P. cuyabensi* sed ostiolo erecto, ascomatis orbicularis 0.4-0.5 mm diametro et ascosporis 24-29 x 10-12 μ m.

Type. U. S. Virgin Islands, St. Thomas: Tutu, 10-16 Mar 1923, Britton, Britton & Kemp 176 (NY, holotype; MICH, isotype).

Thallus corticate, not pseudocyphellate, UV-. Ascomata immersed, hemispherical, 0.4-0.5 mm in diameter, 0.3 mm high; ostiole apical; crystals lacking. Hymenium not inspersed; hymenial gel IKI + blue-green. Ascospores biseriate, fusiform, 4-celled, end cells smaller and elongated, 24-29 x 10-12 μ m (Fig. 1).

Pyrenula expectata is named because a broad knowledge of variation in the Pyrenulaceae permits its existence to be predicted with some surety. The *Pyrenula cuyabensis* group to which *P. expectata* belongs is characterized by the lack of crystals in the ascomatal wall, hymenium IKI + blue-green lacking oil droplets and most importantly by the ascospore

type which has the end locules reduced in size and elongated (Fig. 1). Of the five species previously known for this group, four have parathelioid ascomata and one pyrenastroid. *Pyrenula expectata* has pyrenuloid ascomata and fills the gap in ascomatal types for this group of species. Within the Pyrenulaceae I believe that the parathelioid and pyrenastroid ascomatal types are as primitive as or perhaps even more primitive than the pyrenuloid type. Certainly in this case where all the known relatives are parathelioid or pyrenastroid, I feel sure that the pyrenuloid ascoma of *P. expectata* is derived.

The *P. cuyabensis* group not only demonstrates that ascomatal type cannot be reasonably used to define genera in the Pyrenulaceae (one would have to separate these obviously related species into three genera) but also supports the idea that ascospore septation does not define genera since *P. erumpens* R. C. Harris has submuriform ascospores and I would predict that species with muriform ascospores will eventually be found.

Pyrenula expectata is known only from the type but I would not be surprised to find it in the Dominican Republic. The *P. cuyabensis* group is entirely neotropical, as far as is known, occurring in low elevation, rather dry, open forest types, best represented in southern Brazil and southern United States.

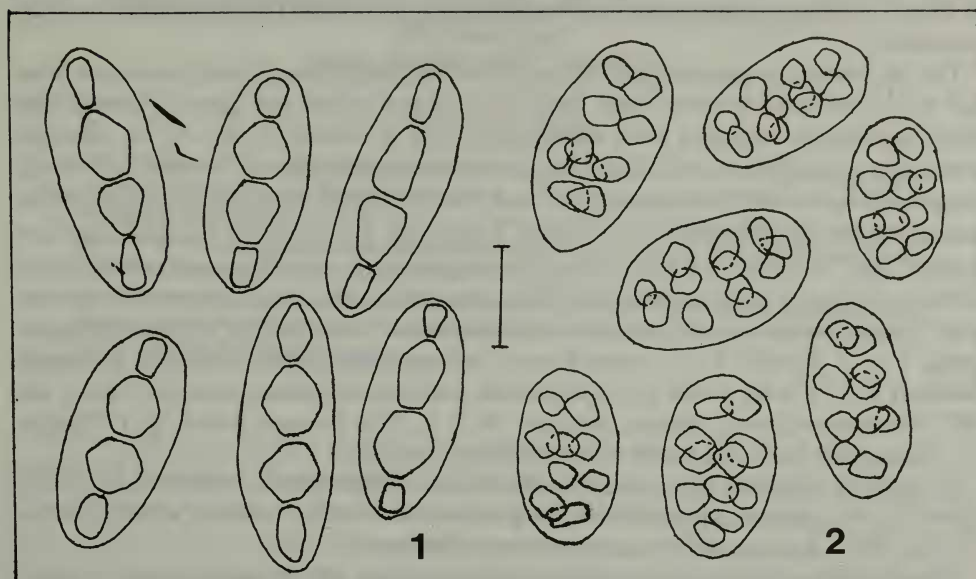
***Pyrenula kermesina* R. C. Harris, s. nov.**

Thallus ruber, non corticatus. Ascomata immersa composita 3-6 loculata. Hymenium non inspersum gelatino hymeniale IKI + aurantiaco. Ascosporae ut in *Pyrenula ochraceoflava* locellis 4-seriatis, seriebus medianis quaternis, terminalibus binis vel raro quaternis, 17-22 x 10-12 μ m. Type. Dominican Republic, Prov. Monte Cristi: El Morro de Monte Cristi, moist summit of limestone mesa on coast, elev. 237 m, on decorticate wood, 8 Jan 1987, Harris 19512 (NY, holotype; B, BM, H, JBSD, US, isotypes).

Thallus not corticate, entirely red or pigmented mainly over ascomata in weathered portions, not pseudocyphellate, KOH + purple, UV-. Ascomata mostly immersed, visible as slightly raised wart elongated with the grain of the wood, up to 5 mm by 1-2 mm, usually more strongly pigmented than the surrounding thallus, consisting mainly of bark, containing 3-6 chambers; ostoles remaining distinct but emerging, usually in a single row, in a common gelatinized plug; crystals lacking. Hymenium not inspersed; hymenial gelatin IKI + initially blue-green then rapidly bright red-orange. Ascospores uniseriate to irregularly biseriate, ellipsoidal, with locelli in four rows, middle rows with four locelli each, terminal rows mostly with two locelli but rarely with four, 17-22 x 10-12 μ m (Fig. 2).

Pyrenula kermesina is unique, readily identified by its red thallus, pyrenastroid ascomata and small muriform ascospores. Its occurrence on decorticate wood is also unusual as almost all other species of *Pyrenula* grow on bark.

In the field I assumed that this collection was either *Pyrenula cruenta* (Mont.) Vainio or *Pyrenula cruentata* (Muell. Arg.) R. C. Harris as these were the only taxa with a red thallus known to me from the Americas. Under the microscope it was immediately evident that *Pyrenula kermesina* was not at all closely related to the above. This reinforces my belief (Harris, 1989) that red pigmented thalli have evolved several times within *Pyrenula*. In the Mueller/Zahlbruckner system *P. kermesina* would be assigned to the genus *Parmentaria* Fée (pyrenastroid ascomata, muriform ascospores). *Pyrenula kermesina* is not related to any other species with pyrenastroid ascomata known to me. It is related to the *P.*



Figs. 1 and 2. 1-Ascospores of *Pyrenula kermesina* (holotype. 2. Ascospores on *Pyrenula expectata*.

ochraceoflava group which until now did not contain any species with parathelioid or pyrenastroid ascomata. *Pyrenula palmarum* (Krempelh.) R. C. Harris, **comb. nov.** (*Verrucaria palmarum* Krempelh., J. Mus. Godeffroy 1: 109, pl 14, f. 7. 1874) from the Pacific is similar in its red thallus but differs in having a simple unilocular ascoma and in smaller ascospores with only two rows of locelli. I am completely baffled as to how *P. kermesina* fits into the phylogeny and biogeography of the *ochraceoflava* group. It seems unlikely to have evolved recently as several steps separate it from the other American species. This would imply that it is a relict. This does not seem unreasonable as the group seems to be an old one. It contains several pantropical species as well as species, perhaps isolated by extinction of intermediate taxa, with restricted distributions in Africa and the Pacific and even one African taxon which has evolved the highly derived mazaedioid type of ascoma.

That such a relictual species should occur on El Morro de Monte Cristi seems odd but its combination of more or less continuous high humidity and low elevation are perhaps unique. It is the only place I know in the West Indies where *Roccella* is extant. *Roccella* is otherwise known only from old Cuban records. *Catapyrenium* and *Peltula*, both of which are also rare in the region, are abundant. Other lichenized Loculoascomycetes occurring on El Morro de Monte Cristi are *Anisomeridium subprostans* (Nyl.) R. C. Harris, *Polymeridium subcinereum* (Nyl.) R. C. Harris *Pyrenula cerina* Eschw., *P. cocoes* Muell. Arg., *P. ochraceoflavens* (Nyl.) R. C. Harris, *Trypethelium eluteriae* Sprengel and *T. ochroleucum* (Eschw.) Nyl. The associated non-lichenized Loculoascomycetes are *Ciferriolichen majusculus* (Nyl.) R. C. Harris, **comb. nov.** (*Verrucaria majuscula* Nyl., Lich. Jap.

92. 1890), *Tomasellia californica* (Zahlbr.) R. C. Harris and *T. eschweileri* (Muell. Arg.) R. C. Harris. Although I have not completed determination of my collections, it is clear that El Morro de Monte Cristi is very important lichenologically and I hope it will be carefully preserved.

The day before the manuscript of the paper on North American Pyrenulaceae was to be sent to the printers I received word that the conserved author and date of *Pyrenula* had been clandestinely changed from Massalongo, 1852 to Acharius, 1814 by the editorial committee of the Berlin Code. I have no quarrel with the new date as it is what I informally proposed (Harris, 1973) but do object to such drastic changes being made without public announcement or discussion. In retrospect I wish that I had left the nomenclature unchanged and "cluttered" the literature with a couple dozen superfluous names and combinations. However I did not and in my haste to meet the deadline made an error, as one often does working in haste, and created a superfluous name in the *Pyrenula cuyabensis* group, i. e., *P. fulvella*. The corrected name and synonymy follow. ***Pyrenula personata*** (Malme) R. C. Harris, **comb. nov.** *Pyrenastrum personatum* Malme, Ark. Bot. 19(1): 10. 1924. *Pyrenastrum fulvum* Malme, Ark. Bot. 19(1): 9. 1924. *Pyrenula fulvella* R. C. Harris, Mem. New York Bot. Gard. 49: 92. 1989 nom. superfl.

In examinig adicional type material from the neotropics I have discovered and older name for the common pantropical/subtropical species which I called *Pyrenula cinerea* (Harris, 1989). Also an additional synonym was discovered.

Pyrenula microcarpa Muell. Arg., Bot. Jahrb. Syst. 6: 42. 1885. *Pyrenula cinerea* Zahlbr., Ann. Cryptog. Exot. 5: 202. 1932. **syn. nov.**

Pyrenula insularum H. Mag., Ark. Bot. ser. 2, 3(10): 241. 1956. Type Hawaiian Island, Oahu, Mann & Brigham (FH-Tuck 4107, syntype), **syn. nov.** Additional synonymy may be found in Harris (1989).

Pyrenula microcarpa is distinguished by the white, noncorticate, UV-thallus, hymenium not inspered, IKI - and medium size ascospores, 19-25 (-25) x 8-12 (-13) um. It is known so far from only two collections in the Dominican Republic, one from Prov. Independencia, Sierra de Bahoruco, 1800 m, *Buck 14585* (NY) and the other Prov. La Vega, km 17 on Jarabacoa-La Vega Road, *Harris 15755B* (NY).

Acknowledgements

I am grateful to Tom Zanoni for facilitating work in the Dominican Republic and for his companioship and friendship. I thank Ricardo García for his help on the trip to El Morro de Monte Cristi and others.

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